2014 Progress Report

Trans-Beringia Muskoxen

Creation of Ecological Baselines in an Era of Arctic Warming

Joel Berger

Backdrop and Context

This report summarizes the final year of a project aimed to develop baseline ecological information on muskoxen, the largest land mammal of the polar region. Muskoxen once roamed with wooly mammoths and saber tooth cats. They became extinct in Asia but persist in North America's Arctic. Their persistence may be jeopardized by climate change, by chance events, and by increasing indirect and direct interactions with humans. In the Beringia region, these threats also create opportunities to carry forth bi-lateral projects with the aims of capacity building, scientific exchange, and, in the case of this project, to achieve biological conservation. Specifically, to understand the nature of environmental change, the key project goal has to find creative, non-invasive ways to measure changes across time. To do so, the aim has been to develop photogrammetry to assess the size and growth rates of young animals and to then compare them between study areas over time.

Our project has built upon collaborative USA-Russian cooperation to conduct training in photogrammetry in both Chukotka and Alaska. The chief accomplishments have been two simultaneous photogrammetric expeditions, one on Wrangel Island - Chukotka and the other in two National Park Service units - Bering Land Bridge and Cape Krustenstern. Additionally, talks were delivered in both countries, training sessions were concluded, local guides hired, and Blogs and other forms of outreach conducted. The key achievements are summarized here and a more technical and scientific report will follow.

Key Achievements

Collaboration and Cooperation

This project has built upon collaborative USA-Russian government conservation efforts dating back to the 1970s when muskoxen were introduced from Alaskan to Wrangel Island (Fig. 1). The University of Montana has been collaborating with the National Park Service and Wildlife Conservation Society in Beringia on muskoxen since 2007 and more specifically on this photogrammetric project from 2012-2014. The Wrangel Island State Reserve has been a partner starting in 2012.

Developing and fostering collaborations between North American and Russian scientists and wildlife managers is key in addressing the impacts of climate change on the shared wildlife populations of the region, and in this case to identifying critical clues as to why some populations of muskoxen are stable, while the survival of others is in jeopardy.

Wrangel Island Federal Reserve – Climate Refuge for Muskoxen?

Although muskoxen were introduced onto Wrangel Island Federal Reserve four decades ago, it is unclear how climate change will impact this flagship species. The Wrangel muskoxen population in Chukotka has been robust in part because of abundant food and also because reindeer have served as alternative prey for the wolves that colonized the island. However, changes due perhaps to warming temperatures and a shifting predation regime involving polar bears may soon limit growth. For instance, polar bears now feed on muskoxen (Figure 1), which may signify a changing predator-prey system with sweeping implications for how we consider a shifting Beringia landscape.

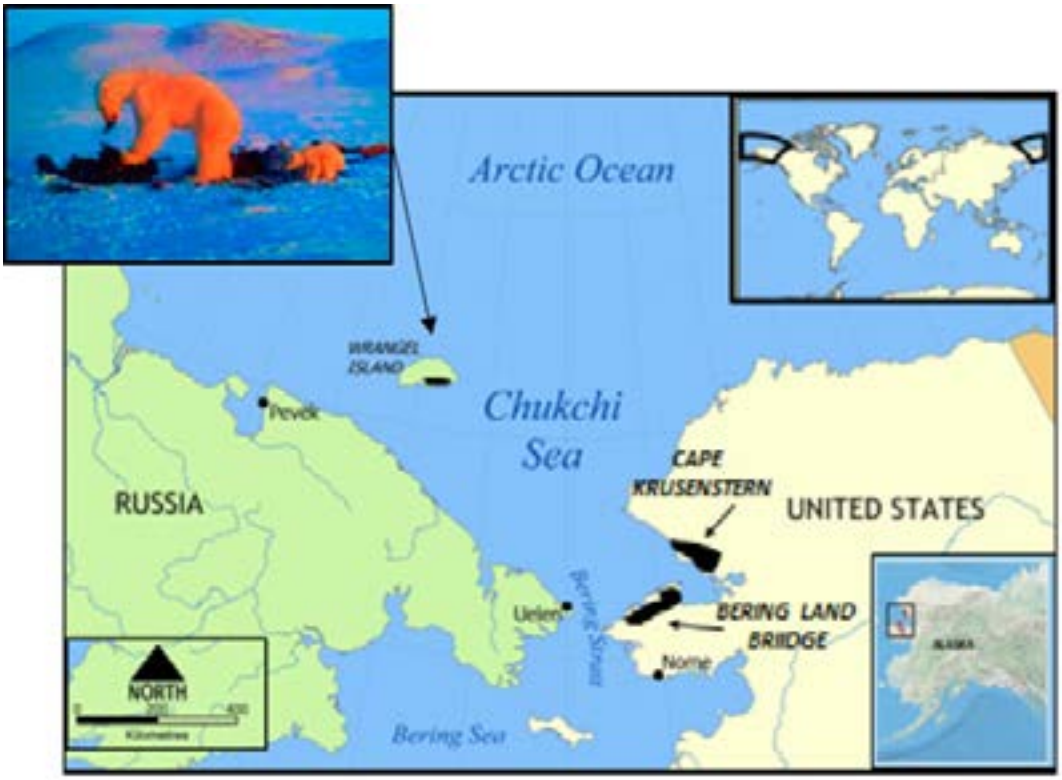

Fig. 1. Location of the three 2014 areas in eastern and western Beringia where body sizes of 1, 2, and 3 yr old muskoxen were estimated during winter and spring 2014. Polar bear photo on muskoxen by O. Starova.

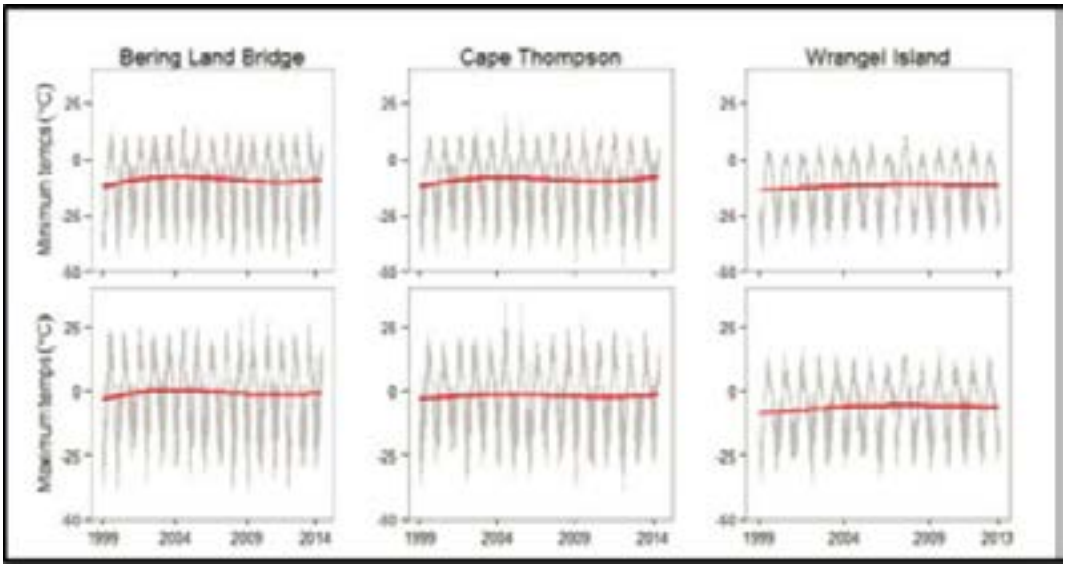

Fig. 2. Estimated trends in daily temperatures (min & max for years 1999 - 2014; 2013 for Wrangel) for three study sites (gray). Red lines are trends across years.

Whether Wrangel Island can serve as a climate refuge for muskoxen and other cold-dependent species is unclear. Current minimum and maximum temperatures are warmer and more varied in areas of Alaska with muskoxen than in Chukotka, which initially suggests that the Wrangel State Reserve might serve as a climate refugia for cold-adapt-

ed species (Fig. 2). On the other hand, rain-on-snow events are more frequent on Wrangel than in Alaska (Figure 3). Because icing events render food unavailable to Arctic ungulates, the possibility of starvation increases.

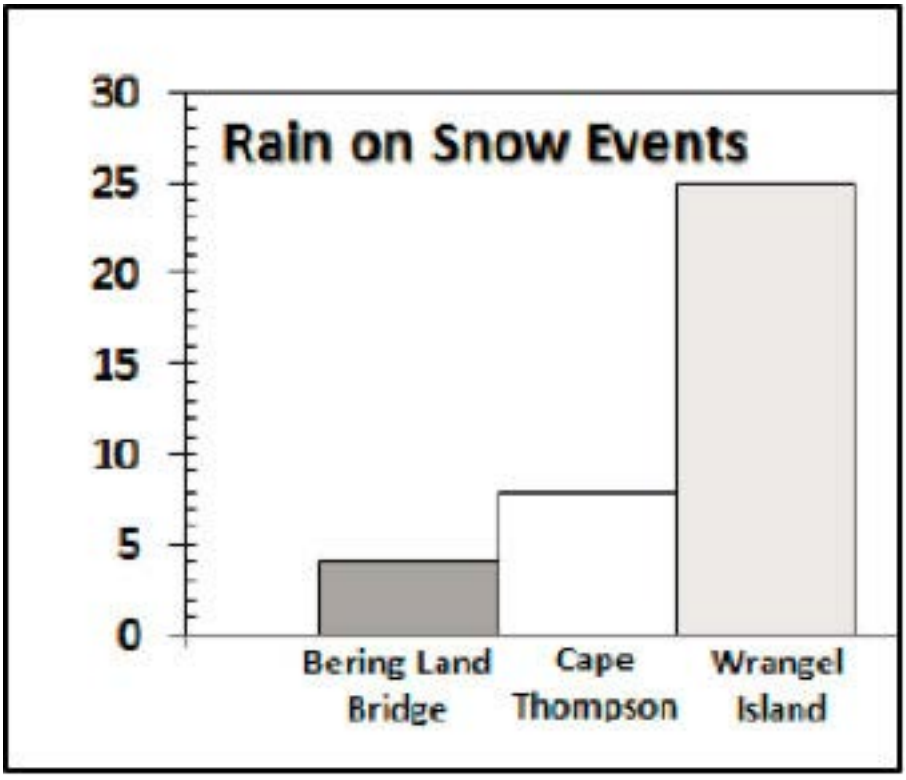

Fig. 3. Frequency of rain-on-snow events (# of days with snow on the ground & temperatures > 0oC with recorded precipitation in winter (~Oct-Nov to Apr-May) for last 10 years (Alaska sites), 9 years (Wrangel).

Joel Berger and a Russian-born researcher, Yelizaveta (Lizza) Protas, worked directly with counterparts on Wrangel Island, providing training and conducting non-invasive surveys of muskoxen using innovative digital photo-imaging techniques. Through the analysis of digital photographs, the team measured how body sizes and growth rates of young and juvenile muskoxen are impacted under different climatic regimes, and worked collaboratively across borders to establish baseline conditions for muskoxen across the Russian and American Arctic. We are pleased to report on project activities and achievements in greater detail below.

Capacity Building through Photo-Imaging Techniques

Our efforts – both on Wrangel and in Alaska – have focused on using photo-imaging to document the growth rates of muskoxen juveniles as a proxy to understand relationships between food quality and possible impacts of climate change. To establish baseline values to gauge effects of climate change on muskoxen, we have relied on a simple photo-imaging procedure that was published two years ago1. It involves estimating the size of an animal's head, and using this to determine how size varies across different age for males and for females. The method has the advantage of being sensitive to small changes in the sizes of juveniles that reflect growth between the ages of one to three years of age.

The process involves four steps:

A. Finding animals in the field;

B. Photographing animals at known distances;

C. Processing images and charting heads sizes by computer program to estimate change; and

D. Configuring results into a useable framework to assess if changes occur across time and if (in this case) the Wrangel population differs from those elsewhere.

We successfully accomplished this with Russian biologists (Dr. Alexander Gruzdev, Director of Wrangel Federal Reserve and Olga Starova, Chief Scientist), a crew involving rangers from the reserve, and Russian born interpreter Lizza Protas of WCS. Each of the steps A-C is portrayed in the following mosaic of figures, starting with the twin challenges of safety for fieldwork on Wrangel Island – bears and extreme temperatures (Fig. 4). All figure legends are labeled from top left to bottom right. For Step D we then offer context and how this information will be useful to facilitate additional bilateral conservation.

Additional, we hired 5 guides from the Shishmaref and Kotzebue region on the expedition led by University of Montana Blake Lowry. This continued to generate both data as well as offering several employment opportunities I the areas where I (Berger) have worked in prior years.

Fig. 4. Mother and two cubs feeding on muskoxen. Investigation of a muskoxen skull – small black dots on distant hill are live muskoxen; Ambient temperature at negative 32oC; Bear approach. Photos © O. Starova and J. Berger.

A) Preparing to find animals in the field.

Wrangel Island is a large, Yellowstone-sized protected area and lacks roads, other infrastructure, and amenities. Numerous steps are involved in accessing the remote area and in assuring safety for participants. Figure 5 depicts the landing of personnel and appropriate gear required for winter sustenance, and its transport to a cabin for shelter. Efforts to find muskoxen required searches by foot and subsequently by snow machine.

B) Additional logistics on preparing to find animals for photo-imaging.

While finding animals is simple conceptually, as highlighted in Figure 6, high latitudes bring exceptional challeng-

es. These involve high winds, steep mountains, dangerous precipices, ice in fuel lines, limited visibility, and cold temperatures. However, with perseverance animals can be located (Figure 7), approached, and distances measured between subject and biologist. With photos in hand, it is then possible to begin to store data on individuals of different ages and different sexes, which will enable preliminary assessments of data once downloaded.

Figure 5. MI-8 drop off of personnel and gear, establishment of a first research and construction field camp, ranger Evgeni and in background Dr. Alexander Gruzdev (left) and Olga Starova (blue hat), and field biologists returning from fieldwork after the snow machine journey. Photos © J. Berger.

Figure 6. Lizza Protas preps for the daily mission, discussing plans with co-worker; Joel Berger preps for snow machine ride; Olga Starova, Lizza, and Evgeny at snow machine; and Lizza (small inset) and Evgeny hiking along ridge with snow machine below at base of mountain. Photos © J. Berger.

Figure 7. Olga Starova prepares lens settings for photo-imaging exercises with Lizza Protas looking on; Olga in-between two muskoxen groups for photogrammetry assessments of head sizes; Joel Berger and Olga approach herd; and close-up photos of four juveniles and an adult female.

C) Processing images and using a computer program to calculate head sizes.

With field photos captured and stored on memory cards, data are transferred to a data repository. A series of equations and algorithms are then used to measure the shape of heads of individual males and females of known ages. Figure 8 reflects the process with Lizza Protas translating (and Joel Berger looking on) as Olga Starova measures heads on the computer and then enters data into a spreadsheet. Figure 8 expands on team development and relationship-building illustrating both Gruzdev and Berger.

Figure 9. Key study team members: Protas, Starova and Gruzdev (learning computational techniques); Gruzdev and Berger celebrating successful data, downloads, and computations; and sunset at remote camp. Photos © J. Berger

D) Configuring results into a useable framework to assess if changes occur across time and if (in this case) the Wrangel population differs from those elsewhere.

The data that have been generated are important from two perspectives. The first relates to climate and population performance. Knowing the size of one, two, and three year old animals means that changes in their absolute and relative size can now be contrasted with growth in subsequent years. This will enable assessment of how warm or cold winters and summers enhance or retard the rates at which individuals change size. Just as nutrition is important to the growth of juvenile humans (and all mammals), we can use these data to understand how changes in climate impact Wrangel Island animals. In other words, across time it will be possible to chart whether animals grow larger or smaller as Arctic environmental conditions change. Second, at a broader scale, Wrangel Island is a portion of the broader Beringian landscape. Because this project and past efforts have also enabled similar assessment of muskoxen on the Beringian side of Alaska, it is now possible to ask how the Wrangel animals fit into a broader framing of how environmental conditions affect different populations of muskoxen. Using these initial data and associated approaches, bilateral cooperation can further be developed through the process of understanding other population stressors. For instance, given the possible changing dynamics involving prey (muskoxen) and predators (polar bears), relationships between the two species can be further assessed through the transfer of knowledge between researchers in the United States and Russia involving the species' specific behavior and interactions.

Challenges Encountered While weather and logistics will always be fundamental to work in remote Arctic sites, the largest challenge involves transport while on the island. Snow machines are often not in working condition, and even when repaired they frequently fail. Only about 25% of the on Wrangel had machines of sufficient reliability that they could be used in the field. Most days were spent dealing with machines that were not functional. This sort of problem could be avoided in the future by accessing more reliable snow machines, such as those from Japan or the United States.

Education, Communication, and Outreach

Three additional components of this project were communicated both within and outside of Alaska. 1) a Blog from Wrangel Island and communicated globally through Yale Environment 360 site; 2) an Op-Ed in the Christian Science Monitor on scientific cooperation and collaboration to enhance climate research on biodiversity; and 3) nine lectures. Because of complicated logistics of accessing and then working in Russia's Chukotka autonomous zone none were within Alaska in 2014 although eight were in Alaska in prior years. Five additional ones will be delivered in Alaskan villages in early 2015 – Wales, Shishmaref, Kivalina, Kotzebue, and Nome. The specific of each of these three above activities reproduced below.

Acknowledgments to partners

Generous assistance and funding from the Shared Beringian Heritage Program, the Trust for Mutual Understanding (New York) and the Wildlife Conservation Society (Bronx Zoo, New York) helped make this project possible. The PI is most grateful, especially to both, and the Beringia Program staff who contributed selflessly to the execution of this project, as well as to Dr. Alexander Gruzdev and others from the Pevek or field office of the Wrangel State Reserve.

Yale Environment 360 Blogs (First of Three)

[On Far-Flung Wrangel Island, A Scientist Sizes up Muskoxen]

09 Apr 2014

It is minus 22 degrees Fahrenheit when I step off the Yakutia Airlines jet in Pevek, located on the East Siberian Sea in Russia's extreme Far East. Given the temperature, I'm relieved to see that all five of my duffels have arrived, as I have no idea what this expedition holds in store. Will I be camping? Will cabins available? And what of food? One thing I've learned about working in Greenland or Svalbard or Arctic Alaska is to be prepared. So I have packed two warm sleeping bags, three pairs of boots, three face masks, an assortment of gloves and goggles, a massive parka, my requisite coffee, muesli, dried currants, power bars, and 35 freeze-dried meals.

Pevek — population 4,500, and the northernmost town in Russia and all of Asia — is just a way station for me and my Russian colleagues. Our destination is Wrangel Island, two hours farther by air and located in the Arctic Ocean some 300 miles north of the Arctic Circle.

I'm not here as an adventurer, but as a scientist. Up to this point, communications about advance preparations have been sparse. Fortunately, I am accompanied by a gifted translator, Yelizaveta (Lizza) Protas. Part Russian and part American, Lizza will make certain that whatever science skills I possess will be made tangible to my Russian counterparts and, in turn, assure that I understand theirs. Lizza has never been to the Arctic, nor has she ever seen an ovtsebyk, the Russian word for the resplendent long-haired mammal we will be studying — the muskox.

My mission is to train my Russian colleagues in the use of photogrammetry, a technique that, in this instance, will use photo imaging to understand the precise body-size proportions of muskoxen and their calves. That information will help us determine how the Wrangel Island population is faring in comparison with the populations I have studied in Arctic Alaska, a region warming faster than northeastern Siberia. I will provide my Russian colleagues with some basic photogrammetry equipment — a camera, computer, laser rangefinder, and lenses — enabling them to establish baseline physiological data for muskoxen and some other Arctic mammals. My goal is to understand how different factors affect growth in individual muskoxen. To get sufficiently accurate measurements of the heads and profiles of muskoxen from photographs, we need to get within 50 meters of our Wrangel subjects — any closer might provoke a stampede.

The largest of all Arctic land animals, muskoxen once roamed the Pleistocene landscapes of Asia with woolly mammoths and woolly rhinos. Muskoxen persist in Greenland and parts of the Canadian and American Arctic, but died out in Asia during the recent past. They were returned to Siberia beginning in 1974 through a joint Russian-U.S. program, and the population on Wrangel Island today is estimated at roughly 900. A total of roughly 11,000 muskoxen now exist in the polar Ural region and Siberia.

My efforts to understand climate and other effects on muskoxen go far beyond Wrangel, as I've also organized a simultaneous expedition up the frozen Chukchi coastline, some 450 miles east in Arctic Alaska. There, University of Montana graduate student Blake Lowrey and two skilled native Alaskans have already headed out for some 850 wintry miles by snow machine and traversed areas on the frozen Chukchi Sea between Alaska with Siberia. For the

last six years, as part of the Wildlife Conservation Society's Beringia program to further conservation and science in this region, I've conducted fieldwork on muskoxen populations at two Alaskan sites, Bering Land Bridge and Cape Krusenstern. While the idea of twin Arctic journeys may appear crazy, geographical contrasts have proven exceptionally valuable in the sciences of ecology and climatology.

After spewing fumes and struggling to get off the ground in Pevek, a Russian-made helicopter carries us to Wrangel, weighted with 3 tons of gear, 10 Russians, and me. Once on the island, our supplies are ferried by snowmobile to a central cabin. Our provisions include four rock-hard and skinned reindeer carcasses, giving me some idea of the food arrangements.

Once at the cabin, we work with rangers to make base camp functional. The pit toilets, tucked away in an old wooden building, are filled with snow up to the roof. The door does not open. Our biological needs are destined to be met in other ways, obviously lacking the protection or privacy of a wall. Our drinking water comes from snow melted over fires fueled by the burning of wooden scraps from the camp's numerous dilapidated buildings.

The Russian flag flies horizontal in the stiff wind. In hills three miles distant, I can make out two sets of black blobs: ovtsebyk — muskoxen.

This is the first of three blog posts from the field by conservation biologist Joel Berger, who is a senior scientist with the Wildlife Conservation Society and the John J. Craighead Chair in Wildlife Biology at the University of Montana

Studying a Polar Menagerie On an Island in Arctic Russia http://e360.yale.edu/digest/studying_a_polar_menagerie_on_an_island_in_arctic_russia/4126/ 16 Apr 2014

As I sit on the snowmobile behind the bear-shaped body of Dr. Alexander Gruzdev, the director of Russia's Wrangel Island Nature Reserve, I am reminded that not moving when the temperature plunges to -20 F is a bad idea. Normally accustomed to riding my own snowmobiles in Alaska or the Norwegian Arctic, I can usually stay warm thanks to bouncing and steering. But sitting still behind Alexander, my feet — especially my heels — grow cold. I recognize this as a bad sign, and think of early polar expeditions where heel rot was common.

Numbness soon spreads to my fingers, but I take heart that my goggles — only half frozen by inner fog — allow me to see half of the landscape, including tracks of polar bear and a small wolf pack traveling in synchrony.

Spring has officially begun, but on Russia's Wrangel Island — 300 miles north of the Arctic Circle, in the East Siberian Sea — the date on the calendar means little. As we scientists and accompanying staff travel 30 miles on three snowmobiles, pulling three sleds, the wind bites worse than on recent days, making -20 F feel like -45. We pass 11 groups of muskoxen, planning to return so we can accurately measure the size of the oxen and their calves using a photographic technique known as photogrammetry. These short-legged dwellers of polar deserts are fine with cold temperatures, but they avoid deep snow. Squat bodies on short legs do not make travel through deep snow energetically efficient. At this time of the year, muskoxen scarcely move, and they live mostly off their body fat, akin to the below-ground lifestyle of hibernating bears.

Among our group is Olga Starova, the reserve's 27-year-old lead scientist. She is highly motivated and in superb condition, equally game to walk 12 miles through the snow or to bounce along on the back of a carriage being dragged by a snowmobile. She represents the full-time scientific staff of the reserve and monitors its eclectic assortment of wildlife. After I leave, she will study the roughly 70,000 lesser snow geese that arrive from the U.S. Pacific Northwest, thousands of miles away, and summer on Wrangel. They are Asia's only snow geese, and Olga will record data on clutch size, hatchling success, and arrival and departure dates.

Not quite a Noah's Ark, Wrangel Island — nearly the size Yellowstone National Park — is a UNESCO World Heritage Site, recognized for its polar fauna and flora. The non-glaciated island, with mountains reaching 4,000 feet and rivers 30 miles in length, has 417 species and sub-species of plants — more than any other Arctic island. As many as 100,000 walruses live in Wrangel's waters in the ice-free months. Wrangel was once home to wild Asiatic horses and Pleistocene bison, and wooly mammoths inhabited the island until about 3,000 years ago. The island is believed to have the highest density of polar bear dens in the world. No one knows exactly how many polar bears breed on Wrangel, but a 2004 survey counted 261 animals. We observed polar bears at close range during our expedition as they wandered around our various camps or lumbered across the tundra.

The recent existence of two land carnivores also intrigues me. Wolves have colonized from the mainland, 90 miles distant, traversing the frozen Arctic Ocean. How they figured out that there was prey here, in the form of reindeer introduced in 1948, is unclear. Another recently arrived species is the wolverine, which we photographed using camera traps.

Later in our expedition, I set out with Olga and some local staff to measure muskoxen using photogrammetry. Wind-whipped snow splatters my goggles as I choke on fumes from the stinky, two-stroke snowmobile that is pulling our sled. After taking several hours to cross 15 miles of frozen tundra, we hike up a mountain and get within close range to photograph muskoxen in their defensive circle. We shoot photos of their head sizes at different angles and use a laser range-finder to plot our exact distance to them.

Olga is a quick study, apt at learning the variation in horn and head size shapes in adults and juveniles. Later, staying at a meteorological station in the village of Ushakovskoe — which, with our presence, has now swelled to 18 human inhabitants — Olga and I sit for four hours in front of the computer. We measure head-size dimensions of these Pleistocene survivors from our photos, then run the measurements through a series of algorithms. Today, we were lucky: Five juveniles can be added to our Wrangel data base, all without the risk, expense, or logistical nightmares of tranquilizing animals to measure them.

It has taken me more than eight months to arrange permissions to be here as part of the Shared Beringia Heritage Program of the U.S. National Park Service, the Trust for Mutual Understanding, and the Wildlife Conservation Society's Beringia Program. Our interest is in how Wrangel Island's muskoxen compare to populations on the Alaskan side of Beringia. If different, why? Could it be the result of nutritional variation? Or perhaps differences in climate change between the Russian and American Arctic?

This is the second of three blog posts from the field by conservation biologist Joel Berger, who is a senior scientist with the Wildlife Conservation Society and the John J. Craighead Chair in Wildlife Biology at the University of Montana.

[Russian-American Collaboration Carries on in Key Arctic Ecosystem]

30 Apr 2014

In early spring on Russia's Wrangel Island, dawn comes at 3:45 and the sky is light for 16 hours a day. My Russian colleagues and I make good progress sampling more than 20 herds of muskoxen, gathering valuable data. Yesterday, while hiking in the mountains, we again crossed polar bear tracks. As winter sea ice recedes around this Arctic island, I wonder if the bears will soon be adding muskoxen to their diet, instead of their usual fare of seals.

The contrasts between doing field research in Russia and Alaska are sharp, and nowhere more so than in the realm of safety. Here, there are no seat belts on helicopters, no shovels brought on snowmobiles (in the event we become stuck), no spare tent, bivy sack, or sleeping bag for emergencies. Rarely do our communications work. The adage I know so well — there are old biologists and there are bold biologists, but there are no old, bold biologists — is an unfamiliar one here.

Today, the winds blow, and it's near whiteout conditions. I admire the tenacity of my coworkers. With little modern technology and minimal aerial support, they persevere. Yesterday, the temperature returned to winter with the mercury at -15 degrees F. Soon, we'll shift camps and travel 50 miles to an unheated cabin. My Russian colleagues endure these hardships for one reason — to better understand Wrangel's animals, their movements, and the island's ecology.

I've come to Wrangel Island to join them in this research, my chief goal being to help my fellow scientists learn how to use cameras to measure the dimensions of muskoxen from afar. I've also come to improve scientific cooperation between Russia and the United States in Beringia, that area of northwestern Alaska and extreme northeastern Russia where two countries — and continents — are divided by the Bering Sea. No region in the world has been more affected by climate change than the Arctic, and I am hopeful that the data we gather on muskoxen and other wildlife on Wrangel Island will help science better understand how rapid warming is impacting the Russian and Northern American Arctic.

As the wind howls outside our cabin, I show a PowerPoint presentation to some of the Russian staff and everyone crowds my little computer screen. I focus on how and why we do scientific studies, my words translated by my Russian-American translator, Lizza Protas. I explain why publishing is important, so that all the time and money that go into research can be used to benefit others and the generations that come after us.

I have worked for years in Arctic Alaska, and one reason I came to Wrangel Island — 300 miles above the Arctic Circle — was to see how rapidly warming is occurring here and what kind of data exists. I was delighted to learn that a meteorological station has been operating continuously on Wrangel since 1926. My Russian colleagues gave me digital copies of their weather records, and my U.S. colleagues and I will study this important data to compare temperature trends on Wrangel with data from northwestern Alaska.

No significant climate change studies have been carried out on Wrangel Island. Dr. Alexander Gruzdev, the director of the Wrangel Island Nature Reserve, told me that he has observed no major shifts in the denning chronology of the island's many polar bears. But large parts of the Siberian Arctic are experiencing rapid warming, with sea ice disappearing (as it is throughout the Arctic) and northern Siberia's kettle-like lakes draining as permafrost thaws and cracks.

Five hundred miles to the southeast, across the Chukchi Sea and the Bering Strait, more than 50 muskoxen died suddenly in 2011 from being inundated by frozen slush fueled by 60 mile-per-hour winds while feeding in an inlet near Shishmaref, Alaska. Also on the Alaskan side of Beringia, the shorter snow-free season and warming temperatures are already making it tougher for my native American guides to use their snowmobiles to travel frozen rivers and shores in the pursuit of caribou, which are vital to their villages' food supplies.

The good news is that on both the Russian and the American sides of Beringia there are opportunities. The Shared Beringia Heritage Program enlists Russian and American scientists, as well as the people of Alaska and Russia's Chukotka Autonomous Region, to collaborate on research and citizen science to study wildlife and climate change on both sides of the Bering Sea.

This is the third of three blog posts from the field by conservation biologist Joel Berger, who is a senior scientist with the Wildlife Conservation Society and the John J. Craighead Chair in Wildlife Biology at the University of Montana

Op-Ed in the Christian Science Monitor

Polar bear diplomacy: Where the US and Russia

On an arctic island, US and Russian scientists collaborate on wildlife research. They prove conservation transcends geopolitics.

By Joel Berger

Common Ground
Common Good

Article in Pevek News

ПОЛЯРНАЯ ЗВЕЗДА

Панорама

№ 9 от 12.03.14г Тираж 7007 экз.

НАУКА

Овцебыков сравнит американец

На прошлой неделе в Государственный заповедник «Остров Врангеля» прилетел профессор Университета Монтаны, старший научный сотрудник Общества сохранения диких животных (WCS) Джоэл Бергер.

По словам профессора Бергера, он является специалистом по копытным животным и планирует изучить островную популяцию овцебыков для получения некоторых морфологических характеристик и дальнейшего сравнения их с таковыми у овцебыков на Аляске.

Джоэл Бергер и специалисты заповедника «Остров Врангеля» проведут изучение популяции овцебыков на острове Врангеля с помощью нового метода дистанционного исследования. Разработанная американцами современная методика позволяет определить основные характеристики (размер, строение тела и т.д.) особи по фотографии животного с последующей обработкой снимка с помощью современных компьютерных технологий. После камеральных работ будет проведен анализ состояния популяции овцебыков на Аляске и на острове Врангеля.

– Этот вопрос сейчас очень актуален, так как в последние годы на северо-востоке Аляски начала сокращаться одна из популяций этих уникальных животных, – говорит профессор Бергер. – Это связано с тем, что на Аляске идет более быстрое потепление климата, чем на острове Врангеля. Новая методика исследований даст возможность проанализировать состояние популяции овцебыков на острове Врангеля и, возможно, даст ответ на вопрос: почему сокращается численность овцебыков на Аляске.

Популяция овцебыков на острове Врангеля идеально подходит для решения задач, поставленных американским ученым, еще и потому, что именно из штата Аляска (с острова Нунивак) в 1975 году завезли овцебыков на Врангеля. Сейчас их насчитывается более 800 особей.

За плечами у Джоэла Бергера немало экспедиций и проектов, так или иначе связанных с исследованием жизни копытных. Профессор работал во многих частях света: в Монголии он изучал сайгаков, на Тибете – яков, в Африке – носорогов. Следующей точкой его научных изысканий после острова Врангеля будет Африка. И еще одна любопытная деталь: дед профессора – сибиряк, он родился в Иркутске, но уехал с родителями из России в возрасте двух лет. Так что Джоэла Бергера связывают с нашей страной не только общие интересы, но и происхождение предков.

Начальник ОЭП заповедника «Остров Врангеля» Людмила БЕРЕЗЮК.
Фото О. Старовой.

Presentations

- Colorado Chapter of Wildlife Society (Fort Collins, CO) – Plenary Lecture 2014
- Amer. Society of Mammalogists (Oklahoma City, OK) – Aldo Leopold Lecture 2014
- Society of Conservation Biology (Missoula, MT) 2014
- National Park Service (Innovation, Discovery& and Biodiversity) Workshop - Alexandria VA 2014
- Federal Large Landscape Conference – Washington DC 2014
- Sam Noble Museum of Natural History – Oklahoma City 2014
- National Wildlife Research Center (federal – USDA, Colorado) – 2014
- University of Montana Provost Evening Lecture(Missoula, MT - 2014
- Wrangel Island World Heritage Site - Ushakovskoe, Chukotka, RU 2014